Fertility Transition in Turkey Who Is Most at Risk of Deciding against Child Arrival?

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Abstract

In Turkey, female employment and education are still relatively low, while fertility levels are high compared with other European countries. However, Turkey stands just at the edge of an important social transition. Increasing female education and employment come along with important decreases in fertility. By mobilizing census and survey data, this paper finds that fertility decreases are mainly caused by fewer transitions to a third birth. Graduate women participating in the formal labor market are most at risk of deciding against child arrival in comparison with inactive or unemployed women. The third rank is particularly concerned, as women's income contribution seems to be crucial for many families that already have two children, and the arrival of a third child risks reducing or stopping women's working activities in the absence of institutional childcare support. Policies enabling women to combine work and family life, which have been proven effective in other European countries, emerge as useful to avoid a further fertility decline below replacement level in Turkey.

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Fertility Transition in Turkey–
Who Is Most at Risk of Deciding against Child Arrival?

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1. Introduction

Turkey is currently undergoing important socioeconomic transitions. Economic development comes hand in hand with changes in education and employment patterns, particularly for women for whom secondary and tertiary school enrollment is drastically increasing. And even though female employment rates are still relatively low, they also have been increasing over the past decade, especially for young cohorts.

At the same time, fertility rates have been rapidly decreasing in Turkey over the last decades. On average, Turkish women have still somewhat more than two children, but many policy makers fear an ongoing decline below replacement level. Given the fact that on average, women and men declare wanting to have between two and three children in Turkey (Sobotka and Beaujouan, 2014; Testa, 2012), a drop of fertility below replacement level would imply that parents face barriers for realizing their fertility intentions. If these barriers result not only in birth postponement (tempo effect), but in a decision against child birth, at least of higher rank (quantum effect), completed fertility would drop below replacement level for the near future.

This paper intends to shed light on the continuous fertility decline in Turkey by identifying who is most at risk of deciding against childbirth.

Based on a combination of census and cross-sectional survey data (Survey of Income and Living Conditions, SILC), we first focus on the evolution of completed cohort fertility and find that the proportion of families with three or more children is on the decline, while two-child families are more and more the norm in Turkey. If completed fertility is going to drop below replacement level in the future due to an assimilation process towards Europe, the drop is likely to be caused in main part by parents deciding against second and third child arrival.

The decline in completed fertility in Turkey can be observed for all levels of education, but is most pronounced for low educated women, while higher educated women have low but stagnating fertility rates. However, as the proportion of educated women is increasing, low fertility for educated women explains nevertheless one-half of the decline in completed fertility in Turkey (structure effect), and this part is likely to increase for younger cohorts.

In a second step, we mobilize longitudinal survey data (SILC) to analyze potential determinants of women's and their partners' decision for or against child birth, whereas we distinguish between child ranks. We focus our analysis on women's activity status and control for important covariates such as educational background and the partner's situation in the labor market. To reduce inverse causality, both women's and their partner's activity status is observed during a certain period *before* potential conception. We find that it is graduate women being attached to the formal labor market who are most at risk of deciding against child arrival, and this concerns in particular the third child.

Women who are integrated in the labor market are more at risk of deciding against child arrival than inactive women, most likely because child arrival implies job loss in the absence of possibilities of combining work and family life. The negative effect of employment on child arrival is consistent with the weakness of family policies in Turkey towards educated women in stable employment (work life balance policies such as child care and parental leave for example). The negative effect is particularly pronounced for women already having two children, and most negative for those with a partner who is himself not in stable employment. This reveals the importance of women's contribution to family income. If this contribution cannot be maintained, couples are likely to decide against the third child.

In the near future, education levels of women are expected to increase rapidly for all regions of Turkey. More and more educated women will aspire to be active in the formal labor market while having children at the same time. At the moment, with 30% on average, women's participation in the workforce is rather low in Turkey. We find that women's probability of being employed is cut in half when having children in comparison to childless women.

Turkey is invited to endorse the targets of the Europe 2020 strategy, and to further empower women to have increased access to education and be more actively involved in the labor market. A commitment to raising female employment rates in Turkey in line with the European Employment Strategy would not only increase gender equality and enhance macroeconomic growth due to a rising talent pool (Klasen, 1999, 2002), but female employment also helps to combat social exclusion and child poverty by stabilizing family income.

However, the existing negative impact of female employment on fertility in Turkey risks holding back affirmative action towards female employment. Yet, there are hints that this strategy risks being counterproductive, at least in the middle and long run: Comparing our descriptive and empirical results to those of other European countries reveals that those countries which succeeded in re-increasing fertility rates back to replacement levels are mostly the ones with increasing female employment rates, offering institutional support for parents to combine work and family life (Luci-Greulich and Thévenon, 2013, 2014).

Work-life balance policies, like those that have already proven to be effective in Nordic countries and in France (where fertility levels are around replacement level and converge with families' fertility intentions), emerge as an optimum solution: while higher workforce participation of women will increase family resources, thus enabling couples to realize their fertility intentions, family policies encouraging women to combine work and family life are likely to avoid decreases in fertility which may emerge if women substitute childbearing against employment.

This suggests that in Turkey, enabling parents to have the number of children they wish to have by reducing barriers to child arrival would allow maintaining fertility levels above replacement. Our analysis shows that at the moment, qualified women who succeed in returning back to the labor market after the arrival of a first or second child are particularly at risk of deciding against an additional child. Reducing existing barriers which hinder these women having children and at the same time being successfully integrated in the formal labor market seems thus a major challenge in Turkey.

The paper is organized as follows: Section two gives contextual information about fertility and female employment in Turkey, while section three provides a descriptive overview of trends in fertility and female employment while taking into account interactions with education and regional background. Section four presents results of our micro econometric analysis of the impact of women's activity status on child arrival by distinguishing between ranks. Section five highlights our main findings by comparing them to those found for other European countries, which allows discussing some policy implications.

2. Contextualization: Fertility and female employment in Turkey

Turkey experienced a remarkable fertility decline from 1960 to today, which comes hand in hand with greater access to contraception and family planning as well as later childbearing ages for women (Koç et al., 2010; Inan, 2007).

During the same period, women's education has been increasing, which is often considered a main determinant of the fertility decline in many developing and transition countries (Cohen, 2008 ; Esteve et al., 2012) as well as in developed countries during the 20th century (Skirbekk, 2008).

Based on longitudinal data, Ince (2004) suggests that an increase in 1% of women's education level reduces their fertility level by 1.55%. Gunes (2013) and Kirdar et al. (2011) show that the 1997 reform which increased the duration of compulsory education from 5 years to 8 years, has significantly increased women's' mean age at first childbirth, mainly by decreasing the number of teenage pregnancies. According to Kirdar et al. (2011, the 1997 reform on compulsory education had a higher impact on fertility than the Civil Code law of 2002 reporting the legal age of marriage from 15 to 17 years.

Birth postponement also implied an increase in women's age at first marriage, as in Turkey, the arrival of a first child and marriage are still very time-close events and therewith enabled women to attain higher education levels (HIPS, 1979, 2009 and 2014).

Despite increasing education levels for women, they figure among the lowest in OECD countries (OECD Better Life Index). The gender gap in education has been decreasing in particular for primary education (95% enrollment rate for both sexes) (Turkey Demographic and Health Survey - TDHS, 2013).

Higher education and lower fertility lead to more women being active in the labor market in Turkey for younger cohorts (Ince, 2010). However, the evolution of female employment rates shows two distinctive trends: First, from the years 1980 until the middle of the 2000s, female employment rates (ages 15 to 64) actually decreased due to a reduction of the agricultural sector (from 36% to 25%; World Bank World Development Indicators, 2015 – modelled ILO estimates). Uraz and al. (2010) confirm that low educated women who formerly worked as contributing family workers in agriculture lose their jobs when migrating to urbanareas. Reducing female labor market participation coming hand in hand with initial economic development is generally known as being caused by an educational disadvantage for girls and women, weak formal child care support as well as a social stigma against married women working in the industrial sector ("feminization U": c.f. Goldin, 1994; Luci, 2009). Second, in the past couple of years, women have been sufficiently catching up their educational disadvantage by engaging in secondary and tertiary education and thus increasingly find jobs in the service sector in urban areas (Dayıoğlu and Kırdar, 2010). As a consequence, since the mid-2000s, female employment rates have been re-increasing and reached 32.2% in 2013 (World Bank World Development Indicators, 2015). The increase happened in particular among younger cohorts and more educated women, but with only somewhat above 30%, it is evident that female employment is still way below its potential in Turkey.

At the same time, women's labor market participation serves increasingly to stabilize household income, especially in times of high economic uncertainty and male unemployment (added worker effect; Karaoglan and Okten, 2012). However, the gender wage gap is considerable in Turkey and an important part is explained by pure discrimination. Cudeville and Gurbuzer (2007) emphazise that wages are particularly lower for married women with young children.

Discrimination coming hand in hand with traditional gender roles might explain in part why female labor market participation is still low on average. In line with the theoretical arguments by Goldin

(1994), Dayıoğlu and Kırdar (2010) highlight that social norms nevertheless hinder many women, even the most educated ones, from participating in the labor market, especially when married and having children. Several studies show that dominant conservative religious attitudes are negatively correlated with female labor market participation (Clark et al., 1991; Tsani et al., 2013, Lavy and Zablotsky, 2011; Heineck, 2002; Reitz et al., 2014.). However, the impact of religion gets insignificant once controlled for socioeconomic covariates such as education and income (Bayanpourtehrani and Sylwester, 2013). Socioeconomic development, in turn, is highly correlated with the development of institutions, while both are interdependent (Aghion et al. 2004). In other words, lack or insufficiency of institutions likely explains low female employment in Turkey. Several studies have shown that difficulties in combining work and family life due to the absence of institutional child care support, in particular for young children, represents a strong barrier for both female employment and fertility (Luci-Greulich and Thévenon, 2013, 2014).

Due to this absence, it seems that most Turkish women have to decide between career and family, or at least between employment and family enlargement. Yet, the economic and cultural development in Turkey make room for a hybrid family preference (Mayer et al., 2012), an intermediary model between independent (modern and individualistic) and interdependent (traditional and collectivist) family models defined by family change theory (Kagitcibasi, 2013). This argument is consistent with the mean ideal number of children that women wish to have, reported by the demographic surveys, which decreased only slightly from 3 in 1978 to 2.5 for the 1993-2008 period. The loss in the utilitarian value of children is certainly comes hand in hand with the desire to not have a outstandingly high number of children, yet the increase in emotional value of children does not require small families below replacement level. Today, most Turkish men and women intend to have two or three children. Therefore, in the absence of institutional barriers to having children, fertility levels in Turkey have the potential to stay above replacement level (i.e. if Turkish families succeed in realizing their fertility intentions, total fertility rates should be around 2.5).

The fact that total fertility rates are already below this threshold, it seems that many Turkish families are actually not able to realize their desired number of children. How could we explain this difference between realized and desired number of children (which exists even when taking into account tempo-effects caused by birth postponement)? One explication could be that the direct and indirect cost of children is too high which obliges couples to have fewer children than desired (Becker, 1960; Mincer, 1958).

This antagonism becomes obvious in particular in economically developed regions of Turkey, for which the survey reports the largest difference between the desired and actual number of children. For example, in the West Marmara region, the mean ideal number of children desired is 2.1 while the total fertility rate is 1.38. Also, the mean ideal number is 2.4 in Istanbul and the Aegean region, while the total fertility rate is 1.78 in Istanbul and 1.91 in the Aegean region. The gaps are too important to suggest that they exist only due to tempo effects. Completed fertility is likely to stay below the intended level, mainly because parents face barriers for realizing their intentions.

Reconciling work and family life is difficult for Turkish women, especially in urban areas. There is no binding parental leave regulation for companies (only 16 weeks of maternity leave) and child care coverage is weak on average (Carkoglu et al., 2011). Pre-primary enrollment rates are among the lowest in the world (Kılıç et al., 2009) and way beyond European average. Below 1% of children aged 0 to 2 are enrolled in formal childcare, while the EU average is 28% (Council of Europe, 2009). It is mostly only those children who are born to households which are economically well off who benefit today from

privately organized early child care before being enrolled in compulsory education (Aran ad Ridao-Cano, 2013).

Many couples seem thus at risk of deciding against child arrival in Turkey as they face institutional barriers for starting and enlarging a family while maintaining family income. Our descriptive as well as econometric analysis sheds light on the question what kind of family is most at risk of showing such behavior.

3. Descriptive overview of fertility and female employment in Turkey

Fertility

In Turkey, total fertility rates declined drastically in the last decades. They fell from over 6 children per woman in the year 1960 to 2.08 children in the year 2011 and therewith rapidly converged to the EU (26)[1] average, which fell from 2.7 in 1960 to 1.8 children per woman in 2011 (World Bank World Development Indicators, 2014).

As total fertility rates, completed fertility rates are declining over time – an information we get by combining census with survey data.

Census data[2] provide unbiased measures of completed fertility for cohorts 1910 to 1950 (women who are at least age 50 years in the 2000 and have thus completed their childbearing period). We nevertheless report census data until cohort 1960 (women aged 40 observed in 2000), acknowledging that this measure risks to be somewhat downward biased as a minority of Turkish women aged 40 have not yet completed their childbearing period.

The latest available wave for Turkey is 2000. In order to obtain more recent information about completed fertility, we complement the census data with survey data. For this purpose, we use wave 2011 of the cross sectional module of the European Survey of Income and Living Conditions (SILC) for Turkey.

The main advantage of this survey is the availability of detailed information about education, labor market participation and income – variables which are collected not only on a household but also on an individual level and which will be used in the latter empirical analysis. This information is rarely available in other, more 'demographic' surveys. Some pitfalls emerge, however, due to the fact that the SILC does not report information on the number of children directly. However, children are observed with a proper identification number when living in their parents' households, and households are followed when moving. Nevertheless, we do not know whether the children living at their parents' household are biological or not. We therefore drop households with children whose age difference to their mothers is smaller than 15 years. We also do not observe children when they live with the parent's ex-partner or when they already moved out. Therefore, there is a risk of downward bias of observed fertility for women who are at the end of their childbearing age and who have had their children quite early. We actually observe that the weighted mean of women's age-specific number of children is decreasing after the age of 42 in the SILC cross section wave of 2011 for Turkey. To limit this downward

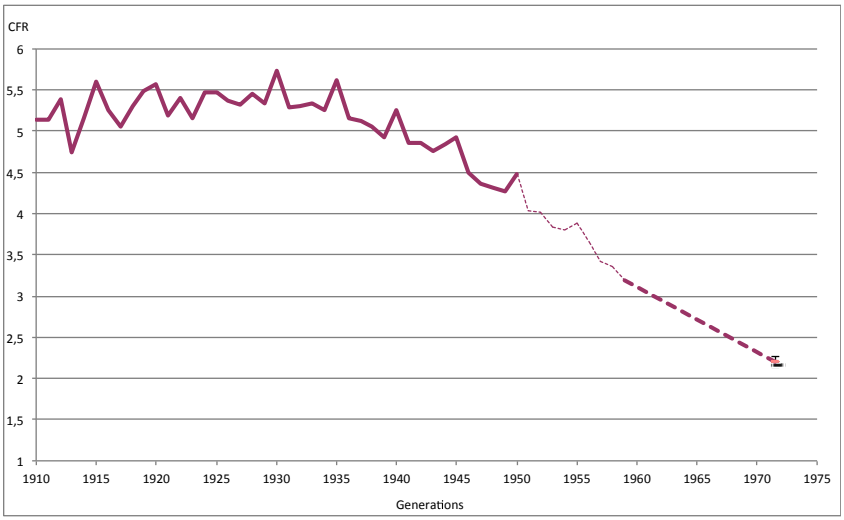
[1] In this paper, the EU average always refers to the arithmetic mean of 26 European countries: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain , Sweden, Switzerland, United Kingdom.

[2] General Population Census (5 Percent sampling) for 1980, 1985 and 2000 provided by the Turkish Statistical Institute; Census data also provided by i-pums.

bias while obtaining a large number of observations at the same time, our approximate completed fertility measures of 2011 are calculated based on women aged 37 to 42 (cohorts 1969-1974)[3].

Figure 1 illustrates the evolution of completed fertility rates in Turkey. The line is divided in three parts: The first one (bold line) presents completed fertility for women aged 50+, who have already completed their childbearing period (census 2000, cohorts until 1950)[4] while the second one (dashed line) is for women aged 40 to 50 (census 2000, cohorts 1950 to1960). The endpoint of the third line (dot line) presents the average number of children observed for cohorts 1969 to 1974 reported by SILC for the year 2011 - a number we call 'approximate" completed fertility rate as the measure is downward biased.

figure 1. Completed fertility rates in Turkey



Data Source: Census (i-pums) 2000 and SILC CS 2011 (women aged 37 to 42)

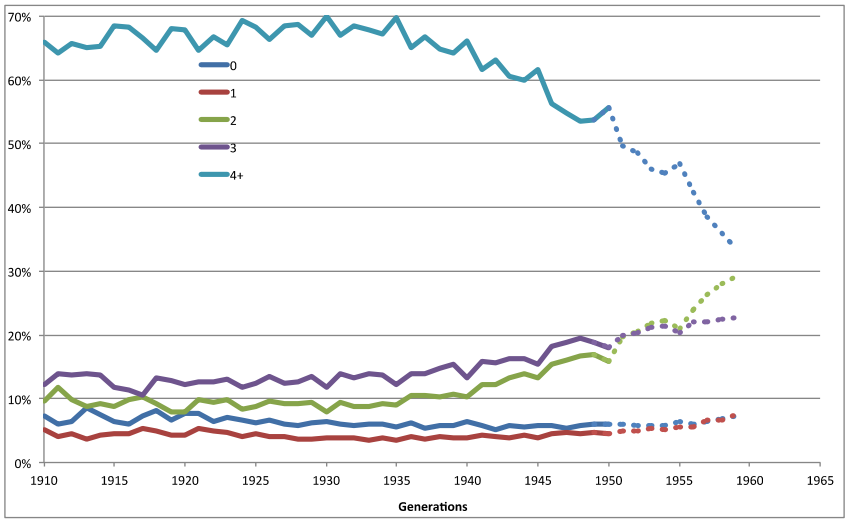
With 2.3 children per women, approximate completed fertility rates are in Turkey still above the weighted EU(26) average (1.72 SILC; 1.79 for the unbiased measure of the Human Fertilty Data Base).

Census data illustrated in figure 2 report an important decline for the proportion of women having four or more children between the cohorts 1930 and 1960, while women having two and three children are on the rise. Childless women and those having one child only represent a constant minority in Turkey until the 1960 cohort.

[3] Note that in comparison to unbiased measures of completed fertility provided by the Human Fertility Database (year 2012, cohort 1970: 2.9 children per women), the SILC reports lower completed fertility rates (year 2011, cohort 1969: 2.4 children per women). A comparison with census data suggests that the downward bias in SILC measures of completed fertility concerns mainly women with 4 and more children. These women risk having their first children at relatively early ages, and these children probably already moved out when their mothers are around their forties. The empirical analysis of this paper focusses on the arrival of a first, second and third child, for which the downward bias in SILC is much lower.

[4] The bold shows specific peaks for every "round" generation (born in a '00 or '05 year) due to the fact that especially for older cohorts, their exact age is unknown and hence women report "round" birth years as proxies.

figure 2. Evolution of parity fertility by cohort in Turkey



Data Source: Census (i-pums) 2000

Figure 3 confirms a low and stable proportion of childless women for the 1969 to 1974 cohort (SILC 2011) but suggests an increase in the proportion of women having one and two children in comparison to older cohorts illustrated in figure 2. The proportion of women havingr three children stagnates, while the proportion of women having at least four children has decreased (note however that the underestimation bias in the SILC data leads to an overemphasis of this decline). Most importantly, figure 3 illustrates that the majority of Turkish women of cohorts 1969 to 1974 either have two or three children. Just like on average in Europe, having two children is the norm for cohorts born around 1970 in Turkey, which was not the case for younger cohorts born before 1960. At the same time, the proportion of women having three or more children is larger in Turkey than on average in other European countries.

When calculating parity progression ratios[5] based on the proportions illustrated in figure 3, we find that 80% of women having one child pass on to have a second child in Turkey, while the EU(26) average is 72%. Among women having two children, 47% are likely to have a third child in Turkey, against only 23% on average in the EU (26) as reported by SILC.

Further calculations based on the proportions of figure 3 reveal that almost half of the gap in approximate completed fertility between the EU(26) and Turkey (1.7 vs. 2.3 children per women) can be explained by an overrepresentation of women having at least two children in Turkey, and almost a further third by the overrepresentation of women having at least three children[6]. More two- and three- child families in Turkey thus make the main difference in approximate completed fertility. The somewhat higher

[5] Parity progression ratio (idem "transition probability") from zero to one child: 89% Turkey and 85% EU; from three to four children: 40% in Turkey and 6% EU.

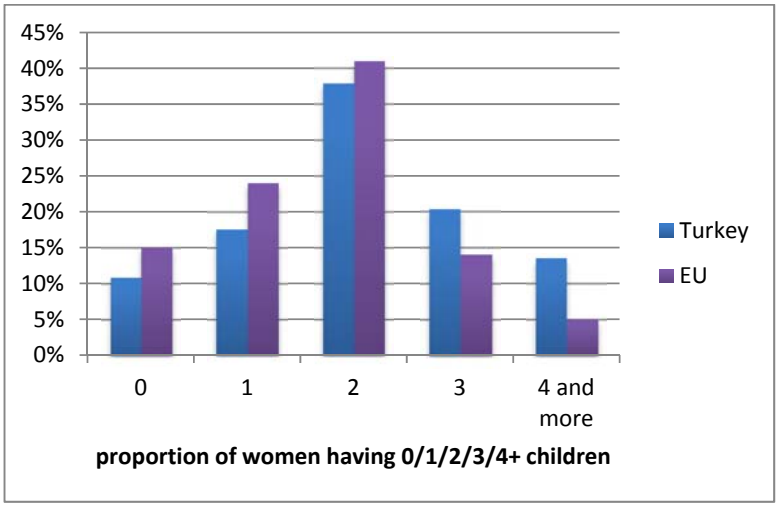
[6] To identify which rank is most responsible for the fertility gap between Turkey and the EU (26), we proceed in two steps. First, we calculate for, Turkey and the EU, the proportions of women having at least *n* children ("cumulated frequencies"). In demographic analysis, the sum of these cumulated frequencies yields the country's approximate completed fertility ("calculation of components by rank"). In a second step, we calculate the differences between the countries' cumulated frequencies. Per definition, these differences sum up to the gap in completed fertility between Turkey and the EU (0.6 children).

childlessness in the EU(26) only explains less than 10 percent of the completed fertility gap. Figure 3 shows that the absolute gap in the proportions is highest for women having at least four children, but this difference between Europe and Turkey explains less than 20 percent of the gap in completed fertility, as even in Turkey, only a minority of women is concerned.

Our calculations suggest at the same time, that if completed fertility is going to drop below replacement level in the near future due to an assimilation process towards Europe, the drop is likely to be caused in main parts by parents deciding against second and third child arrival. Our further analysis of completed fertlity by education and the econometric analysis of child arrival probabilities will shed light on the question which kind of families are most likely to decide against family enlargment in Turkey, especially for child ranks numbers two and three.

Finally, we apply the same calculation logic when comparing the completed fertility rates and the according parity rates of cohort 1960 (figure 1, figure 2) with those of cohorts 1969 to 1974 (figure 1, figure 3). We find that the drop in completed fertility is explained firstly by fewer women having at least three children.

figure 3. Parity fertility by cohort in Turkey in comparison to the EU average

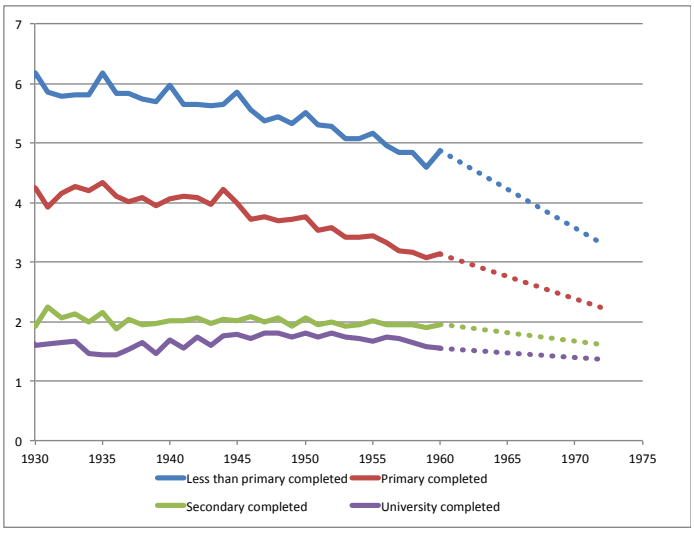


Data Source: EU SILC CS 2011 (women aged 37 to 42)

Completed fertility by education

The fertility decline in Turkey can be observed for all levels of education, but is most pronounced for low educated women. Figure 4 illustrates two trends: Low educated women (less than primary education or primary diploma) experience a drastic fertility decrease, while more educated women (secondary and tertiary) show a much less dramatic fertility decline. At the same time, figure 4 reveals that the average number of children has always been much lower for educated women (below replacement level).

figure 4. CFR by women's education in Turkey



Source: Census (i-pums) 2000 and EU SILC CS 2011 (women aged 37 to 42)

At the same time, figure A in the appendix illustrates a dramatic increase of the proportion of women having *at least* a primary diploma[7]. This implies that the decline in completed fertility rates in Turkey is not only due to a level effect, but also due to a structure effect[8]. Fertility has always been much lower for educated women, but more and more women are educated in Turkey. This structure effect explains about half of the fertility decline in Turkey. The other half is explained by the fact that within each educational group, the average number of children is declining, and this decline is most drastic for low educated women.

When we calculate completed fertility rates by crossing the education level of mothers and their partners (see figure B in the appendix), we observe that the couple's fertility level is more correlated to the woman's educational level than to the education level of their partner. The more the woman is educated, the less will be her completed fertility rate, relatively independent of the education of her partner. The biggest fertility gap is confirmed between women with primary education or less vs. women with at least secondary education, while the fertility difference between secondary and tertiary educated women is less important. For men, we find important fertility differentials within each education group which are explained by the education level of their female partners.

[7] For the youngest observed cohort (1977, aged 23 in 2000), the majority of women (around 60%) have primary completed education. The proportion of women with completed secondary education is sharply rising for the 1960 to 1977 cohorts, and particularly for the latest observed cohorts. Education rates are not presented here for cohorts later than 1977 as our intention is to focus on completed education and completed fertility. We observe actually that the proportion of women with completed secondary and university education is re-decreasing for cohorts younger than 1977 in the Turkish census as these women aged 23 or younger have not yet completed their education. EU SILC data shows, nevertheless, a drastic increase in the proportion of women in secondary and tertiary education for younger cohorts in Turkey. In 2011, 30% of women aged 25 to 30 had secondary education, and 18% university education.

[8] According to census data, the average number of children observed at the end of mothers childbearing years decreased by 2,5 from 5,7 children (1930 cohort) to 3,2 children (1960 cohort). If the number of children per education group had been stable within each education group, but only the repartition of women among education groups had changed, fertility would have decreased by 1,5 children only instead of 2,5 (structure effect). If the repartition of women among education groups had been stable and only the number of children in each education group would have been decreasing, fertility would have decreased also by 1,5 children only. The cumulated effect is a decrease in the average number of children of 2,5 (interactions between the two effects lead to 2,5 instead of 3).

Completed fertility by region

Fertility is characterized by important regional differences in Turkey. In particular, the city of Istanbul has been distinguishing itself for a long time by a quite low fertility profile, even at times of high overall fertility, apart from rebounds coinciding with periods of intense migration. Today, Western regions of Turkey have lower fertility rates than the Central Anatolian and Eastern regions of Turkey. In Western regions, fertility levels are at or under the replacement level since late 1980s and early 1990s. In Eastern regions, fertility rates are still high, while central Anatolian regions have an intermediary fertility profile, compared to Eastern and Western regions (Inan, 2007). These geographic differences reflect mostly socioeconomic differences. The West of Turkey is by far more developed than the East of Turkey (Yavuz, 2006). Another characteristic of fertility in Turkey is the intensity of its internal migrations. Permanent or temporary, most of the time individuals and/or families migrate from the East to the West, from rural to urban and from Eastern Anatolian regions to coastal regions. In most cases, migrations are motivated by economic reasons and related to education, job and income opportunities (Gökhan & Filiztekin, 2008).

The Turkish census data report the province of birth of the mother and reveal that completed fertility levels are significantly higher for women of the South-East region of Turkey (provinces in the South-East are: Kars, Ardahan and Igdir, Agri, Van, Mus, Bingöl, Bitlis, Mardin, Hakkari, Siirt, Batman and Sirnak, Diyarbakir, Tunceli, Sanliurfa) in comparison to the North-West. The fertility decrease over generations can be observed for both regions, but there exists an important fertility gap between the two regions which is constant over all generations. For the 1960 cohort, the average number of children reported by the 2000 census is 3 for women in the North-West against 5.5 for women in the South East (while only 14% of Turkish women live in the South East region). For the cohorts 1969 to 1974, SILC reports also an important South-East/North-West gradient. Approximate completed fertility levels are the lowest in Marmara (1.6) and the highest in Southeast Anatolia (3,5).[9]

So far we have identified important fertility differencials in Turkey according to education and regional background (which might also serve as a proxies for ethnicity). In order to see if education outweights region (or the other way round) we now cross region/ and education for our analysis of fertility differentials.

Crossing education and region

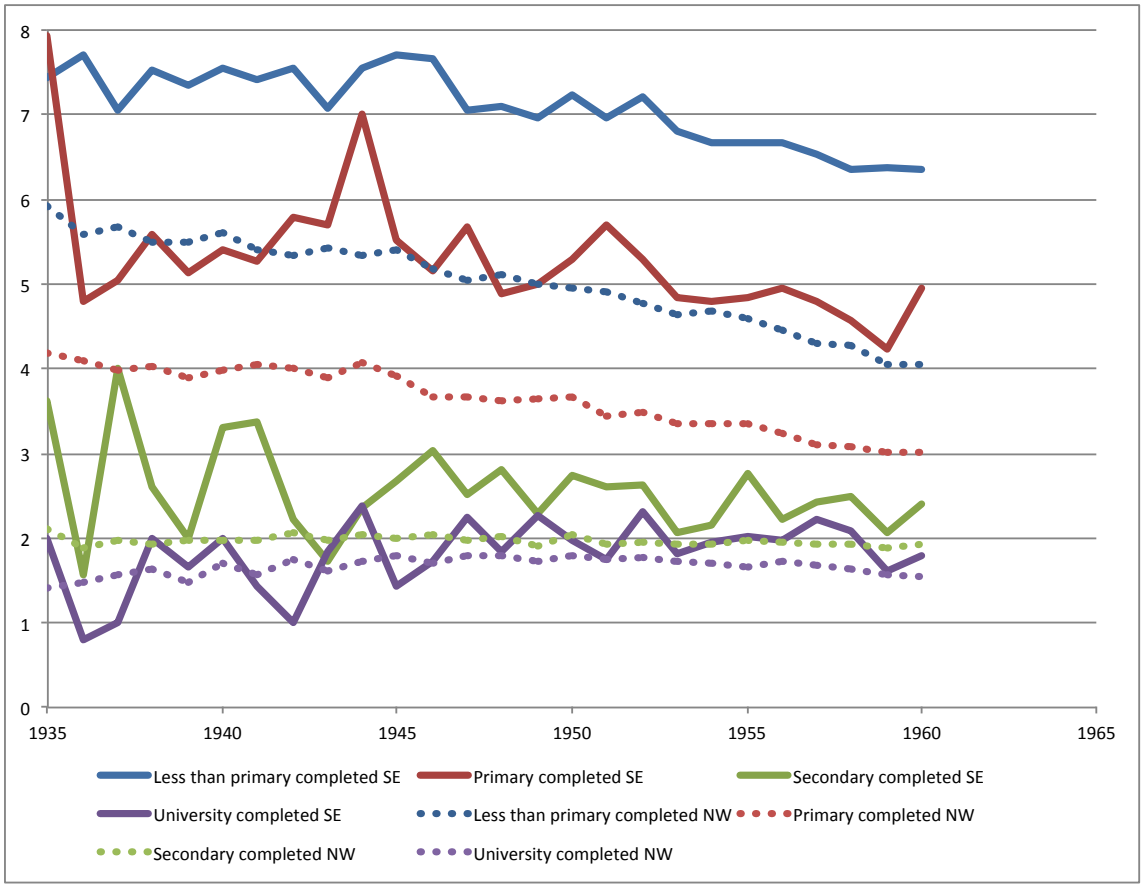
Figure C in the appendix illustrates that according to the Turkish census data, women from the South-East and the North-West follow similar educational trends but throughout all cohorts, women from the North-West are more educated than women from the South-East for all levels of education. The increases in university education can be observed almost exclusively only for North-Western women, and more younger cohorts of women from the North-West pass from primary to secondary education in comparison to women from the South-East. According to official education statistics, education levels of girls remain lower compared to those of boys in Turkey in all regions, while the gender gap is highest for rural regions in the South-East (Hillman & Jenkner, 2004). However, more recently, the gender differences in school enrollment in Turkey have been significantly decreasing over the last decade and

[9] Comparing our approximate completed fertility rates by region reported by SILC with those reported by the Turkish Demographic and Health Survey (2008, women aged 40 to 49) results in the same ranking of regions and suggests that SILC data underestimates fertility rates especially for the South-East region where fertility is highest and mothers have their children relatively early.

since 2005, at least for primary education, the school enrollment rates of girls and boys are mostly identical and close to 100%.

The regional differences in education are maily due to differences in development and urbanization. Investments in higher education of girls might still seem less beneficial to some parents in the Eastern regions, which are dominated by a large agricultural sector. In addition, the local offer in education is still sometimes limited to primary levels of education in some of the South-East regions. Increasing education of younger cohorts in these regions is likely to imply migration to urban areas and/ or Western parts of Turkey and, thus, measures of education levels in rural areas stay low and fertility rates high, while measured education levels in urban areas increase while fertility decreases.

figure 5. CFR of women by regional background and education
(bold line South-Eastern women SE, dot line North-Western women NW)



Source: Census (i-pums) 2000

Figure 5 shows that for cohort 1960, there is an important fertility difference of around 2 children between South-Eastern and North-Western women for the less educated women. For more educated women (at least secondary completed), this regional difference is reduced to 0,5 children only, suggesting that in Turkey, fertility differentials between North-Western and South-Eastern women are likely to dispappear once women of both groups get into secondary education. This education level is not the norm for cohort 1960, neither for South-Eastern nor for North-Western women, but more and more women born after 1960 have completed secondary education, especially in the North-West (figure C).

The SILC data confirm for cohorts 1969 to 1974 that those regions with high approximate completed fertility rates are those with low average education levels and high proportions of illiterate women (Southeast Anatolia: 45% illiterate, against 5% in Istanbul, West Marmara and Aegean). Among the 9% of university educated women of these cohorts, 50% live in Istanbul and Aegean, while only 2% of university educated women live in Southeast Anatolia. Fertility is high in the Southeast, but at the same time only a minority of Turkish women of all education groups live in this region (8%).

Our analysis so far suggests that education, and especially having not completed primary education, is a good proxy for region and ethnicity. We conclude thus that for our micro econometric analysis, taking into account the educational level of women captures quite well their regional background. We will not be able to disentangle effects between education, region and ethnicity, but including education in our regression models will reduce a potential omitted variable bias caused by the fact that we cannot control directly for region (not available in the longitudinal database) and ethnicity (not available in SILC, neither in the cross sectional nor in the longitudinal database).

Female Employment

The decline in fertility rates goes not only hand in hand with education, but also with increases in female employment in Turkey. However, the female labor force participation rate of women aged 15 to 64 is – with 32% in 2012- still quite low in comparison to those of their male counterparts (76%) and the European average for women (67%). The gender-specific employment gap is thus quite large in Turkey in comparison to other European countries (44 percentage points against 11 percentage points on average in the EU). The gender gap is largest for ages 25 to 45. At the same time, in Turkey part-time work is similarly frequent as in most other European countries for women: In Turkey as well on average in the EU, about one-fourth of women participating in the labor force work part time (World Bank World Development Indicators, 2014).

The increase in women participating in the labor market is strongest for younger cohorts. In 2012, 40% of women aged 25 to 29 (cohort 1983 to 1987) participated in the labor force against only 25% of women aged 45 to 49 (cohort 1963 to 1967). At the same time, among the latter cohort, only 20% of women worked at ages 25 to 29 (Turkstat Labor Force Surveys 1992, 1997, 2002, 2007, 2012).

In 2012, one out of two women work in services, which is therewith the largest activity sector for women in Turkey today, followed by agriculture (40%) and industry (10%). Even though agricultural work is on the decline, agriculture was the dominant activity sector for women in Turkey until the year 2008 (see figure D in the appendix), and with 40%, occupations in agriculture are still quite common for women in Turkey (EU average 6% only). Occupations in the service sector are on the rise for women, but lag nevertheless behind the European average of 80% (World Bank World Development Indicators, 2014).

Consistent with the lower stage of economic development, (c.f. OECD 2008, Lastarria-Cornhiel 2006, Agarwal 2003), women in Turkey work less as employees in formal jobs and more in non-registered activities such as subsistence activities in agriculture, as contributing family workers or as self-employed in comparison to other European countries. The proportion of working women active as contributing family workers is 34% in Turkey (EU average 4%), while only 5% of working men are reported as being contributing family workers (EU average 1%, WB WDI, year 2012). 45% of women are self-employed in Turkey (34% of men) (EU average 13% for women, 19% for men). Women working as formal employees represent thus only 20% of active women in Turkey, while the number is 60% for their male

counterparts (EU average around 80% for both men and women, WB WDI, year 2012). The following section includes a discussion of women's activity status, differentiated by child rank, measured by SILC data (tables A to C in the appendix).

Uraz et al. (2010) show that while there is little or no significant difference in female labor market participation between regions (women work in rural areas as well as in urban areas), the impact of the number of children present in the household on women's labor market participation is more negative in urban areas, in particular for low-skilled women.

4. The impact of women's activity status on the probability of child arrival

Data construction

Our econometric analysis of child arrival probabilities in Turkey serves to see which kind of families are most likely to decide for or against child birth, while we differentiate births by rank. We focus our analysis on women's and their partners activity status, but also control for other socioeconomic and demographic characteristics.

To get information about the correlation between child birth and women's employment situation in Turkey, we observe women's activity status *during a certain period before the potential conception of a child*, which allows us to reduce a potential bias caused by inverse causality between labor market participation and fertility decisions (women's degree of labor market attachment might be influenced by family formation- or family enlargement-intentions to). Simply differentiating completed fertility rates by women's activity status (observed in the SILC data, but not in the census data), as we did for education, is not possible here, as women's activity status observed at the time of the survey (at age 37 to 42) is likely to be influenced by their preceding fertility history. For education, this is less the case, as the SILC data reports that most women have obtained their highest educational level before the arrival of a first child (even though we acknowledge that even here, endogeneity issues cannot be completely ruled out).

We estimate women's probability of having a child (differentiated by rank one, two and three) as a function of their activity status (observed before potential procreation) with a logit regression model. We do not analyze the arrival of births of higher ranks as the number of observations of women 'at risk' (having at least three children) gets too small to obtain robust results.

Following Greulich et al. (2014), the data are compiled as follows:

To observe women's characteristics *before* potential procreation, we use the *longitudinal* data set of the SILC covering the years 2006 to 2011 for women aged 15 to 45 years in Turkey. The longitudinal data set is a rotational panel with individuals and households observed for a maximum period of four years. A dummy variable indicating the arrival of a child during the observed period serves as endogenous variable, while we observe the women's and their (if existing) partners' characteristics during a certain period before potential procreation. This data transformation allows us to apply a simple logit estimation model (with robust standard errors).

In order to obtain the information needed, individuals have to be observed over a period of at least three years. Children born in the third and the fourth quarters of each year are generally declared at the interview of the year after as interviews usually take place during the first half of each year. Births that

occur at the end of the year are thus not detectable immediately. Three consecutive years of interviews are thus needed: year *t* and year *t+1* to identify all births that occur in year *t*, and year *t-1* to observe the mothers' (and their partners') characteristics over a certain period before potential procreation.

Around 40% of women are observed not only for three, but for four consecutive years. Women observed for four years who have not had a child in the second year are included twice in our database (two person-years: two years of potential child arrival). Allowing for two potential 'events' increases the number of observations. In order to avoid estimation bias due to unbalanced panel data (the number of observed years may influence the probability of observed child arrival), we include "second event fixed effects" for individuals observed for the second time.

To reduce endogeneity, we not only observe activity status before child arrival, but over a certain period *before potential procreation* of a child. This is possible as the SILC data contains information about labor market status on a monthly basis as well as about the quarter of births of children. For those women with child arrival (test group), we observe their activity status during the three months before procreation. For those women without child arrival in *t* (control group), we arbitrarily chose a three months period during the year for *t-1*.

We define an activity status as "stable" if it does not change during the observed period of three months. The following categories are created for women's activity status during three months before (potential) conception of a child:

- Stable employment (self-employed, employed, full-time, part time)
- Stable unemployment
- Stable inactivity
- Stable student
- Other (retirement, military service, any change in the activity status over the three month period[10])

The event "first child arrival" is observed for 7% of women in our database, while second child arrival is observed for 12% and third child arrival for 3% (see table 1).

table 1. The endogenous variable "child arrival" in Turkey

	time period (year of childbirth)	number of observations	number of events	prop. of events
1st child arrival	2007-2010	5570	368	0,066
2nd child arrival	2007-2010	2621	321	0,122
3rd child arrival	2007-2010	3880	115	0,030
Data Base: EU-SILC LT 2006-2011				

[10] This change is not reported in further subcategories as only a very small minority of women is represented by this group – see descriptive statistics in table A to C in the appendix).

The proportion of observed second child arrivals is larger in comparison to first child arrival, as for second child arrival, the group of observed women is much more homogenous: Women in this group (test and control group) are in most cases in a partnership and as they already have one child, they are unlikely to be infertile. The fact that the proportion of observed third child arrivals is smaller in comparison to second child arrival in all countries is in line with the finding presented in the previous section of smaller transition probabilities from second to third child arrival in comparison to those from first to second child arrival.

Tables A to C in the appendix give a descriptive overview of the exogenous variables including partner characteristics[11] used in our regression models. The proportion of women in stable full-time employment is low for all women and decreasing with child rank. The proportion of women in stable full-time employment is significantly lower for those women who are going to have a second and third child in comparison to those who stay with one or two children. For example, the first line in table B shows that 16% of those women who have one child and who will not have a second child in the following year are in stable full-time employment, whereas among those women who will have a second child, only 8% are in stable full-time employment. Most women are observed inactive, and the proportion is larger for those women who will have a child in the next year. The proportion is largest for women having a third child: 84% of these women are reported inactive during the three months before conception of the third child (line 8 table C). Part-time work as an employee is not common for Turkish women, but self-employment is quite frequent (either full time or part time). Women are actually reported as self-employed in SILC when working as contributing family workers, in subsistence activities in agriculture and in informal and non-registered work. The majority of women's partners are in stable employment.

Estimation results

[11] Note that we control for the presence of a partner only for 1st child arrival as women having already one or two children are all reported with an observed partner. We do not drop women without an observed partner for first child arrival as almost half the Turkish women having a first child in year *t* are observed without a partner in year *t-1*, suggesting that children of rank 1 are likely to arrive in less than 12 months after partners move together. The SILC actually reports zero out of wedlock births in Turkey (proportion of women with child arrival who have an observed partner but are not married). The fact that in Turkey, household formation and the arrival of a first child are quite contemporary events raises the issue of attrition: We might lose a certain number of women in the longitudinal database, who live with their parents in the beginning of the observed period, and are not followed up as they found their own household due to imminent family formation.

Table 2. First child arrival in Turkey

Table: Probability of 1st child arrival in Turkey (logit regressions with robust standard errors)

childless women aged 16-45

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Woman's activity status								
Stable employment	-0.342*	*Ref.*	-0.273	-0.315*	-0.439*	-0.364*	-0.409*	-0.284+
(ft & pt, employed and self-employed)	(-2.38)		(-1.38)	(-2.03)	(-2.31)	(-2.04)	(-2.45)	(-1.48)
Stable unemployment		-0.516						
		(-1.04)						
Stable inactivity		0.543***						
		(3.85)						
Stable student		-2.407***						
		(-4.04)						
Other (unstable, retirement...)		0.698**						
		(2.91)						
Partner information								
Partner in stable employment			-0.0215					
			(-0.09)					
Partner not in stable employment			*Ref.*					
No partner	-3.022***	-2.738***	-3.072***	-3.019***	-3.010***	-3.019***	-3.020***	-3.019***
	(-21.66)	(-19.95)	(-12.91)	(-21.66)	(-16.97)	(-21.66)	(-21.68)	(-21.63)
Women's education								
no graduate (less than primary completed)				0.319				
				(1.88)				
Household labour income								
zero and lowest tercile					-0.0574			
					(-0.29)			
Women's type of employment								
family worker						-0.142		
						(-0.65)		
agricultural work							-0.192	
							(-0.86)	
not registered in social security								-0.292+
								(-1.46)
Interaction terms								
stable employment and stable employed partner			-0.131					
			(-0.47)					
stable employment and no graduation				0.0500				
				(0.12)				
stable employment and low household income					0.269			
					(0.88)			
Woman's age								
16-24	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
25-34	-0.426**	-0.507***	-0.422**	-0.396*	-0.411**	-0.416**	-0.407**	-0.438**
	(-2.73)	(-3.44)	(-2.69)	(-2.55)	(-2.60)	(-2.64)	(-2.60)	(-2.76)
35-45	-3.077***	-3.160***	-3.079***	-3.067***	-3.063***	-3.088***	-3.081***	-3.082***
	(-7.15)	(-7.37)	(-7.15)	(-7.12)	(-7.12)	(-7.15)	(-7.14)	(-7.16)
"Second event" fixed effects	0.252*	0.226+	0.251*	0.254*	0.256*	0.248+	0.254*	0.246
	(1.98)	(1.77)	(1.97)	(1.99)	(2.01)	(1.95)	(1.99)	(1.93)
Intercept	-0.331*	-0.747***	-0.297	-0.414**	-0.306*	-0.360**	-0.337*	-0.353**
	(-2.52)	(-4.45)	(-1.29)	(-3.02)	(-2.07)	(-2.78)	(-2.57)	(-2.72)
Number of observations	5494							
Number of events	347							
Pseudo R^2	0.2289	0.2577	0.2290	0.2306	0.2292	0.2284	0.2292	0.2281
Test of joint significance:								
p (employed if partner employed)[1]			0.0436					
p (partner employed if employed)			0.6327					
p (employed if no graduate)				0.4978				
p (no graduate if employed)				0.3364				
p (employed if low household labour income)					0.4730			

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

"stable employment": employed and self-employed (ft & pt) during 3 months before procreation

[1] test H_0: ($\beta_{\text{stable employment}} + \beta_{\text{interaction: stable employment and stable employed partner}}$)=0

Table 2 shows regression results for the determinants of first child arrival in Turkey. Model 1 shows that being in stable employment is significantly negatively correlated with the probability of having a

first child in comparison to all other activity categories. Model 2 distinguishes the other activity categories and shows that women who are in inactivity have a higher probability of having a first child in comparison to women being in stable employment (the estimation coefficient of the category 'other' is also significantly positive, but only very few women are in this category).

The following three models include categorical variables for partner status, education and income as well as their interactions with the categorical variable 'stable employment'. This procedure allows differentiating the effect of women's stable employment on first child arrival by partner status, education and income.

Model 3 suggests that the negative effect of employment is significant for those women who are with a partner who is himself in stable employment (-0.27-0.13, joint p-value 0.0456), meaning that once women have an employed partner, the probability of having a first child is higher for those women who are not employed.

Employment is significantly negatively correlated with first child arrival only for graduate women (model 4; effect of employment for non-graduate women representing 18% of observed women: -0.31+0.05, p-value 0.4978) and only for households with medium and high income levels (model 5; effect for zero and low income households representing 73% (60% zero and 13.3% low) of households: -0.3+0.27; p-value 0.475).

For models 6 to 8, the categorical variable 'stable employment' represents only a certain type of employment, while the other types are included separately. Model 6 shows that employment is significantly negatively correlated with first child arrival in contrast to other activity categories only for employees and employers, but not for family workers (representing 29% of observed active women). The same is valid only for women active in non-agricultural activities, but not for those in agricultural activities, representing 30% of active women (model 7). Model 8 shows finally that for women both registered and non-registered in social security, employment is significantly negatively correlated with first child arrival in comparison to all other activity categories (42% of women's employment activity is non-registered in this sample).

Table D in the appendix shows regression results for women's probability of being stable employed for childless women. When transferring estimation parameters of column one into probabilities[12], we find that 48% of childless women aged 25 to 34 are in stable employment. Columns one and three further show that there is a significantly positive impact of women's age and education on the probability of being in stable employment for childless women. Column two shows that women with a partner who is himself not employed also have higher chances to be not employed in comparison to women with an employed partner and women without a partner. We conclude that the more childless women are educated, the higher their probability of being in stable employment, even when controlling for age. Women with university education have a significantly higher probability of being stable employed in comparison to women with primary and secondary education, and women with less than completed primary education have a lower probability of being employed in comparison to women with primary and secondary education. When referring this finding to the results of table 2, we conclude that for those educated women who are employed in formal working activities outside the agricultural sector, employment has a significantly negative impact on 1st child arrival. For low educated women who are mainly working as contributing family workers in agriculture, being active does not influence their probability of having a first child.

[12] $P(Y=1)= e^L/(1+ e^L)$ where L is logit and e is Euler's constant .

Table 3. Probability of 2nd child arrival in Turkey (logit regressions with robust standard errors)

Table: Probability of 2nd child arrival in Turkey (logit regressions with robust standard errors)

married women aged 16-45 having one child, with observed partner

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Woman's activity status								
Stable employment	-0.285+	*Ref.*	-0.783+	-0.306+	-0.279+	-0.498*	-0.525**	-0.539*
(ft & pt, employed and self-employed)	(-1.82)		(-1.49)	(-1.81)	(-1.44)	(-2.39)	(-2.64)	(-2.35)
Stable unemployment		-0.889						
		(-0.88)						
Stable inactivity		0.328*						
		(2.08)						
Other (unstable, retirement, student…)		-0.220						
		(-0.61)						
Partner information								
Partner in stable employment			-0.374+					
			(-1.90)					
Partner not in stable employment			*Ref.*					
Women's education								
no graduate (less than primary completed)				0.518*				
				(2.43)				
Couple's joint labour income								
zero and lowest tercile					0.234+			
					(1.60)			
Women's type of employment								
family worker						0.0944		
						(0.40)		
agricultural work							0.113	
							(-0.50)	
not registered in social security								-0.138
								(-0.64)
Interaction terms								
stable employment and stable employed partner			0.576					
			(1.04)					
stable employment and no graduation				0.116				
				(0.27)				
stable employment and low household income					0.0719			
					(0.22)			
Woman's age								
16-24	0.252 +	0.247+	0.257+	0.178	0.200	0.224+	0.218+	0.223+
	(1.71)	(1.66)	(1.73)	(1.17)	(1.33)	(1.50)	(1.47)	(1.49)
25-34	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
35-45	-1.959***	-1.961***	-1.999***	-2.015***	-1.995***	-1.963***	-1.996***	-1.961***
	(-5.77)	(-5.77)	(-5.78)	(-5.85)	(-5.81)	(-5.73)	(-5.78)	(-5.71)
Age of first child								
0	-1.060***	-1.064***	-1.071***	-1.082***	-1.073***	-1.063***	-1.068***	-1.062***
	(-4.64)	(-4.65)	(-4.68)	(-4.78)	(-4.72)	(-4.65)	(-4.68)	(-4.65)
1-2	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
3-6	0.322*	0.334*	0.339*	0.346*	0.335*	0.327*	0.330*	0.320*
	(2.11)	(2.19)	(2.21)	(2.26)	(2.20)	(2.14)	(2.16)	(2.09)
7+	-0.423 +	-0.393	-0.431+	-0.403	-0.422+	-0.416+	-0.418+	-0.425+
	(-1.67)	(-1.55)	(-1.70)	(-1.59)	(-1.66)	(-1.64)	(-1.64)	(-1.67)
First child is female	0.154	0.155	0.149	0.144	0.150	0.154	0.165	0.153
	(1.20)	(1.21)	(1.16)	(1.12)	(1.17)	(1.20)	(1.29)	(1.19)
"Second event" fixed effects	0.115	0.121	0.117	0.109	0.117	0.117	0.117	0.116
	(0.89)	(0.93)	(0.90)	(0.84)	(0.90)	(0.90)	(0.90)	(0.90)
Intercept	-1.608***	-1.905***	-1.294***	-1.645***	-1.688***	-1.595***	-1.602***	-1.591***
	(-10.28)	(-9.64)	(-5.65)	(-10.47)	(-10.17)	(-10.17)	(-10.24)	(-10.11)
Number of observations	2351							
Number of events	303							
Pseudo R^2	0.1064	0.1089	0.1084	0.1107	0.1083	0.1079	0.1091	0.1080
Test of joint significance:								
p (employed if partner employed)[1]			0.2091					
p (partner employed if employed)			0.6961					
p (employed if no graduate)				0.6385				
p (no graduate if employed)				0.1007				
p (employed if low household labour income)					0.4394			

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

"stable employment": employed and self-employed (ft & pt) during 3 months before procreation

[1] test H_0: ($\beta_{\text{stable employment}} + \beta_{\text{interaction: stable employment and stable employed partner}}$)=0

Table 3 shows regression results for the determinants of second child arrival in Turkey, confirming the results found for first child arrival. Being in stable employment is significantly negatively correlated with the probability of having a second child, while women who are in inactivity have a higher

probability of having a second child (model 1 and 2). However, the negative estimation coefficient of employment in column 1 of table 3 is somewhat smaller and less significant than the one for first child arrival in column 1 of table 2.

Stable employment of women is significantly negatively associated with second child arrival if the partner is himself not in stable employment (model 3), but the coefficient gets insignificant for women who have a partner in stable employment.

Stable employment is significantly negatively correlated with second child arrival only for graduate women, but is insignificant for non-graduate women who represent 11.5% of observed women already having a first child (model 4). Employed women also have a significantly lower probability of having a second child in comparison to women with other activity categories (inactive, unemployed…) when being in a household with middle or high income, but there is no significant difference in the probability of second child arrival between activity categories for women with zero and poor household labor income, representing 40% of the sample (10% zero and 30% low) (model 5). The effect of employment is significantly negative for women working as employees and employers, but insignificant for contributing family workers, representing 33% of active women in the sample (model 6). We find a significantly negative coefficient for women engaged in non-agricultural activities, but not for those active in agriculture (representing 35% of active women in the sample) (model 7). Finally, only for women in registered activities, employment significantly decreases their probability of having a second child, while there is no significant difference in the impact of employment vs. non-employment for women in informal activities (43%) (model 8).

Table E in the appendix shows regression results for women's probability of being stable employed for women having one child. Based on the estimation parameters of column one, we calculate that on average, 25% of women aged 25 to 34 having one child aged one or two are employed, which is a reduction of 50% compared to the estimated employment rate for childless women of table D. Table E further shows that for women with one child, the probability of being in stable employment increases with age. Women with university education have a significantly higher probability of being in stable employment in comparison to those with primary and secondary education, but women with less than primary education also have a higher probability of being employed. Low educated women might be active in the presence of a first child because the family needs the additional income of the mother and because mothers' working activity is probably informal work, as contributing family worker, in the agricultural sector, and thus easier to combine with childrearing than work as a formal employee. Referring to table 3, a similar explanation might serve to understand why women active in these sectors do not have a lower probability of second (and first as table 2 has shown) child arrival in comparison to inactive or unemployed women, but women active in formal jobs outside agriculture do have a lower probability of second (and first) child arrival in comparison to inactive women, unemployed women (and students): For low educated women working in subsistence activities, child arrival might not necessarily imply job loss. For educated women in formal activities, child arrival is likely to come in hand with a work and income cessation for a considerable period in Turkey. This is why women who are already inactive or unemployed have a higher probability of deciding in favor of a child in comparison to educated women working in formal jobs outside agriculture. Besides this explanation, we acknowledge that education and type of employment can also capture non-observed characteristics like norms, values, access to family planning etc.

Table 4. Probability of 3rd child arrival in Turkey (logit regressions with robust standard errors)

Table: Probability of 3nd child arrival in Turkey (logit regressions with robust standard errors)

married women aged 18-45 having two children, with observed partner

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Woman's activity status								
Stable employment	-0.849**		-1.601+	-1.020**	-1.017*	-1.178*	-1.328*	-1.399+
(ft & pt, employed and self-employed)	(-2.94)		(-1.60)	(-2.85)	(-2.50)	(-2.28)	(-2.57)	(-1.93)
Stable unemployment		/						
Stable inactivity		0.908**						
		(3.15)						
Other (unstable, retirement, student…)		-0.0346						
		(-0.05)						
Partner information								
Partner in stable employment			-0.296					
			(-1.06)					
Partner not in stable employment			*Ref.*					
Women's education								
no graduate				0.843***				
				(3.30)				
Couple's joint labour income								
zero and lowest tercile					0.0932			
					(0.43)			
Women's type of employment								
employed as family worker						-0.620+		
						(-1.72)		
employed in agriculture							-0.562	
							(-1.64)	
not registered in social security								-0.676*
								(-2.08)
Interaction terms								
stable employment and stable employed partner			0.850					
			(0.81)					
stable employment and no graduation				0.572				
				(0.92)				
stable employment and low household income					0.382			
					(0.66)			
Woman's age								
18-24	0.756**	0.755**	0.748**	0.586*	0.719**	0.734**	0.717**	0.727**
	(2.82)	(2.81)	(2.77)	(2.17)	(2.61)	(2.64)	(2.62)	(2.69)
25-34	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	
35-45	-1.189***	-1.182***	-1.197***	-1.225***	-1.185***	-1.186***	-1.181***	-1.180***
	(-3.60)	(-3.58)	(-3.61)	(-3.65)	(-3.58)	(-3.56)	(-3.56)	(-3.55)
Age of second child								
0	-0.812*	-0.801*	-0.807*	-0.793*	-0.805*	-0.804*	-0.804*	-0.806*
	(-2.09)	(-2.06)	(-2.08)	(-2.07)	(-2.08)	(-2.07)	(-2.07)	(-2.08)
1-2	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
3-6	0.397+	0.404+	0.407+	0.455+	0.407+	0.396+	0.396+	0.394+
	(1.52)	(1.54)	(1.55)	(1.77)	(1.58)	(1.52)	(1.52)	(1.51)
7+	-0.273	-0.255	-0.269	-0.223	-0.265	-0.279	-0.278	-0.290
	(-0.78)	(-0.73)	(-0.77)	(-0.64)	(-0.76)	(-0.79)	(-0.79)	(-0.82)
Age difference between first and second child	-0.165**	-0.166**	-0.163**	-0.144**	-0.162**	-0.164**	-0.165**	-0.164**
	(-3.07)	(-3.11)	(-3.05)	(-2.73)	(-2.99)	(-3.05)	(-3.06)	(-3.05)
First two children have same sex	0.412*	0.416*	0.411*	0.435*	0.405*	0.415*	0.409*	0.416*
	(2.06)	(2.08)	(2.05)	(2.15)	(2.02)	(2.07)	(2.04)	(2.08)
Intercept	-2.631***	-3.509***	-2.390***	-2.849***	-2.675***	-2.644***	-2.623***	-2.642***
	(-8.60)	(-9.23)	(-6.11)	(-9.29)	(-8.36)	(-8.65)	(-8.57)	(-8.65)
Number of observations	3644							
Number of events	109							
Pseudo R^2	0.1061	0.1091	0.1075	0.1198	0.1070	0.1059	0.1079	0.1060
Test of joint significance:								
p (employed if partner employed)[1]			0.0138					
p (partner employed if employed)			0.5867					
p (employed if no graduate)				0.3701				
p (no graduate if employed)				0.0111				
p (employed if low household labour income)					0.1249			

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

"stable employment": employed and self-employed (ft & pt) during 3 months before procreation

[1] test H_0: ($\beta_{\text{stable employment}} + \beta_{\text{interaction: stable employment and stable employed partner}}$)=0

Table 4 shows regression results for the determinants of third child arrival in Turkey, confirming and reinforcing the results found for first and third child arrival.

Being in stable employment is significantly negatively correlated with the probability of having a third child, while women who are in inactivity have a significantly higher probability of having a third child (model 1 and 2). At the same time, the coefficient of employment is more negative and more significant for third child arrival in comparison to first and second child arrival. This reveals that employed women are most likely to decide against the arrival of an additional child if they already have two children. In other words, it is in particular employed women having already two children who face particular barriers for family enlargement in Turkey.

Stable employment of women is particularly detrimental for third child arrival if the partner is himself not in stable employment (model 3), but the coefficient stays significantly negative also for women who have a partner in stable employment. This points to the importance of women's contribution to family income, independent of the partner's situation. It seems that if women work in the presence of two children, their income is indispensable for the household. The couple thus cannot afford the arrival of a third that would reduce or stop women's working activities, at least for a certain moment.

Stable employment is significantly negatively correlated with third child arrival only for graduate women, but is insignificant for non-graduate women who represent 10% of observed women already having two children (model 4). The relative difference between non-graduate and graduate women concerning impact of stable employment on the probability of child arrival is highest for third child arrival in comparison to first and second child arrival. Thus, educated women who are employed face the most important barrier for fertility, and this barrier is highest for third child arrival.

Employed women also have a significantly lower probability of having a third child in comparison to women with other activity categories (inactive, unemployed…) when being in a household with middle or high income, but the difference in the probability of third child arrival between activity categories for women with zero and poor household labor income, representing 40% of the sample (4% zero and 32% low), is significant only on the 13% level and the coefficient is less negative (-1.02+0.4) (model 5). The effect of employment is significantly negative for women working as employees and employers, and still significantly negative, but with a smaller coefficient (-0.62 instead of -1.18) for contributing family workers, representing 43% of active women in the sample (model 6). We find a significantly negative coefficient for women engaged in non-agricultural activities, but the coefficient is less negative and insignificant for those active in agriculture (representing 46% of active women in the sample) (model 7). Finally, for both women in registered and in non-registered activities, employment significantly decreases their probability of having a third child, but the estimated coefficient for non-registered activities, representing 60% of active women, is less negative (-0.7 instead of -1.4) (model 8).

Table F in the appendix confirms that education and age increase the probability of being in stable employment for women having two children. Based on the estimation parameters of column one, we calculate that on average, 18% of women aged 25 to 34 having a second child aged one or two are employed.

The fact that being in stable employment is negatively correlated with the probability of child arrival for all three ranks suggests the existence of a negative correlation between fertility and female employment on the macro level. Comparing the size of the coefficients, we conclude that the negative effect of employment is stronger negative for third than for second and first child arrival. Especially women having already two children and returning back to the labor market after the arrival of a second child are likely to decide against having a third child. This concerns in particular educated women employed in

the formal sector, but also those working in non-registered activities as contributing family workers face a barrier to family enlargement. This might be due to the fact that women's income is needed to guarantee a sufficient income for a family with two children. The costs of a third child are difficult to bear in particular for those families in which mothers would have to reduce or stop working at the arrival of a third child.

5. Conclusion

The evolution in terms women's education and female employment illustrates that Turkey is undergoing drastic and rapid demographic and socioeconomic changes. Despite the fact that the majority of jobs for women in Turkey still require only low qualification and do not provide social security, the number of registered and paid female workers is increasing from year to year[13]. Given the general trend and the policy backup, female employment rates are likely to increase in Turkey in the near future, especially for young women who are just finishing higher education. Gender and family norms are just starting to change, and Turkish women increasingly represent a strong talent pool for the Turkish labor force. Women's economic empowerment in terms of education, employment and income represents an important motor for social and economic progress (Cagatay and Özler, 1995; Klasen, 2002; Luci, 2009; World Bank, 2012). In parallel, fertility rates have been rapidly decreasing in Turkey over the last decades. On average, Turkish women have still somewhat more than two children, but an ongoing decline below replacement level would harm the socioeconomic equilibrium of the country.

This paper shows that the fertility drop is most likely to occur because parents decide against a second and third child. Graduate women being attached to the formal labor market are most at risk to decide against child arrival. The probability of child arrival is significantly reduced for women who are in formal employment against those who are inactive or all ranks, but employment is more negatively correlated with child arrival for a third child in comparison to a second and first child. Informal employment in agriculture as family workers is less negatively correlated to child arrival than formal wage activities. This type of activity seems to cause fewer difficulties for combining work and child raising, but only for the first and second child. Employed women having already two children face particular barriers for family enlargement in Turkey, independent of the type of activity, as it seems that their wage is crucial for household income. For these families, the arrival of a third child is costly especially if it implies a reduction or cessation of women's working activities.

At the same time, most Turkish women, even the educated ones, declare wanting to have between two and three children. Women deciding against child arrival are thus most likely the ones facing a conflict between work and family life.

Given the fact that in Turkey, women increasingly work in formal jobs outside agriculture, difficulties to combine formal work and family life risk leading to a further decrease in fertility. Qualified women who succeed in returning back to the labor market after the arrival of a first or second child are particularly at risk of deciding against an additional child in the absence of institutional support facilitating a combination of work and family life. The third child necessities a sufficient level of

[13] This evolution is encouraged by the government which promised employers premiums if they formally employed women or younger workers – a program intended to ease unemployment, which quickly rose due to the 2008 global economic crisis.

household income, and for many families this income level can only be guaranteed if both partners are active in the labor market.

Several European countries have already been dealing with a work-life-balance conflict. While female employment rates have been rising in all European countries, fertility rates have been declining since the 1960s until the 1990s. Over the last decade, fertility has been stagnating at relatively low levels below replacement level, as for example in Germany, Austria, Italy, Spain or several Eastern European countries, while some other countries, such as France or the Nordic countries, experienced a significant re-increase in fertility back to replacement level. Luci-Greulich and Thévenon (2013, 2014) show that the re-increase in fertility is strongest in those highly developed countries providing institutional support for partners to combine work and family life. In these countries, increases in female employment come hand in hand with increases in fertility. Female employment and fertility are thus no longer contradictory objectives (see also Myrskilä et al, 2009). Female employment is even likely to facilitate fertility in the presence of institutional work-life balance support. A successful integration of women in the labor market not only before but also after childbirth generates family income which enables family enlargement.

This intuition is confirmed by Greulich and al. (2014), who find that the positive pattern between fertility and employment, which has been observed on the aggregate level, can be confirmed for the micro level. They show that in most European countries, employed women have a higher probability of family enlargement than women being inactive or unemployed. The positive correlation is particularly strong for educated women in high fertility countries, where child care coverage is high. A stable employment position is most likely to create a secure economic environment, which seems to be a crucial condition for deciding in favor of family enlargement. Family policies enabling mothers to combine work with family life, in particular the provision of childcare for young children, are most likely to encourage women's decision for a second child. Childcare policies can thus be viewed as an important tool to promote simultaneously women's fertility as well as women's employment. Besides, labor market policies are needed to encourage a stable integration of women in the labor market.

In Turkey, almost 80% of children live in households with a single earner - this is the largest proportion among European countries (EU average 40%). The proportion of children living in a household with both parents not working is also relatively large compared to other European countries (OECD Family Data Base, 2014). As a consequence of Turkey's particular parental employment pattern with maternal employment around 22% only, child poverty rates are extremely high in Turkey (27% in Turkey, 10% on average in the EU; OECD FDB 2014). It seems likely that more and more couples decide against family enlargement due to economic instability.

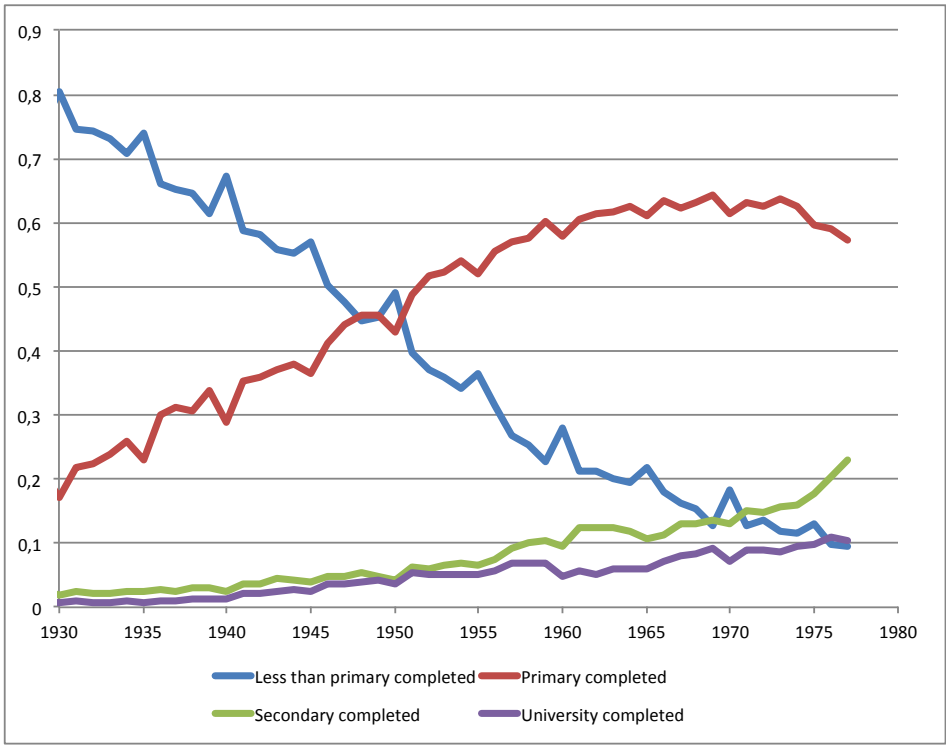
At the moment, policy action in Turkey privileges a pro-natalist approach with targeted cash transfers intending to encourage families to have a child of a higher rank (3+). Child care coverage is generally low in Turkey, but particularly in rural areas. Below 1% of children aged 0 to 2 are enrolled in formal childcare, while the EU average is 28%. Child care coverage is also low for children aged 3 to 5 (20% in Turkey against 80% in the EU; OECD FDB 2014). Paid parental leave is also among the lowest in Turkey in comparison to other European countries, among other reasons because many employers are opposed to reforms in that field (Council of Europe, 2009). Combining work and family life is thus not possible for women, especially when having several children, and cash transfers only offer insufficient compensation.

This paper has shown that in Turkey, female employment and education come along with decreases in fertility so far, while educated and employed women are particularly at risk of deciding against child

birth. Learning from the experience of its European neighbor countries might help Turkey to avoid fertility rates declining below replacement level in the near future. Dissolving the negative association between employment and fertility emerges as a major challenge for Turkey. To stimulate female employment and fertility at the same time, encouraging work-life balance for families has been proven to be a fruitful option.

6. Appendix

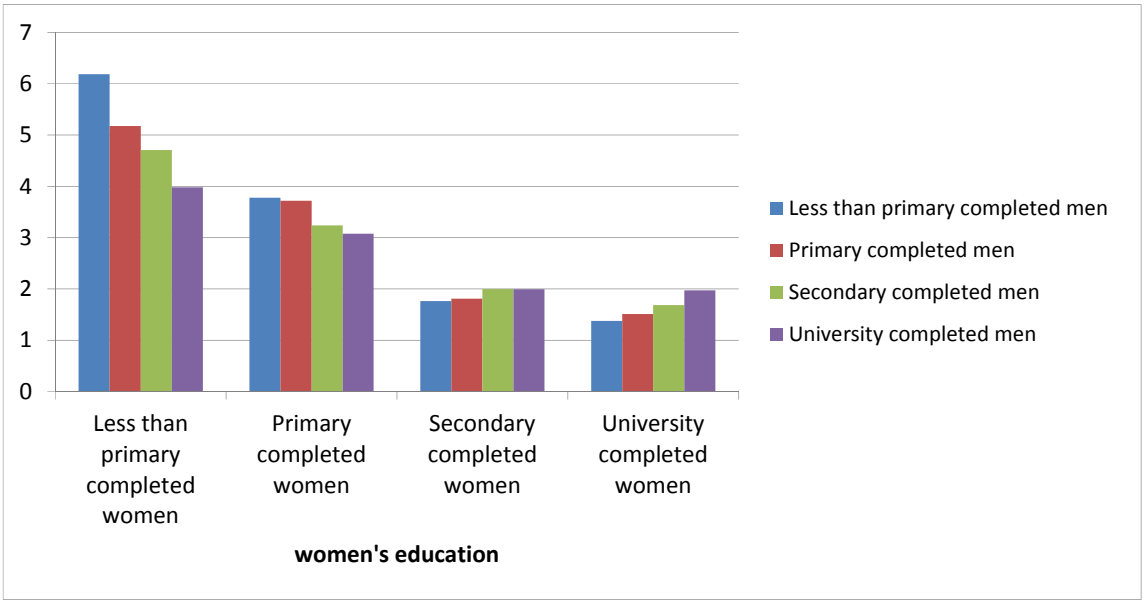
figure A. Poportion of women (cohorts) by education in Turkey

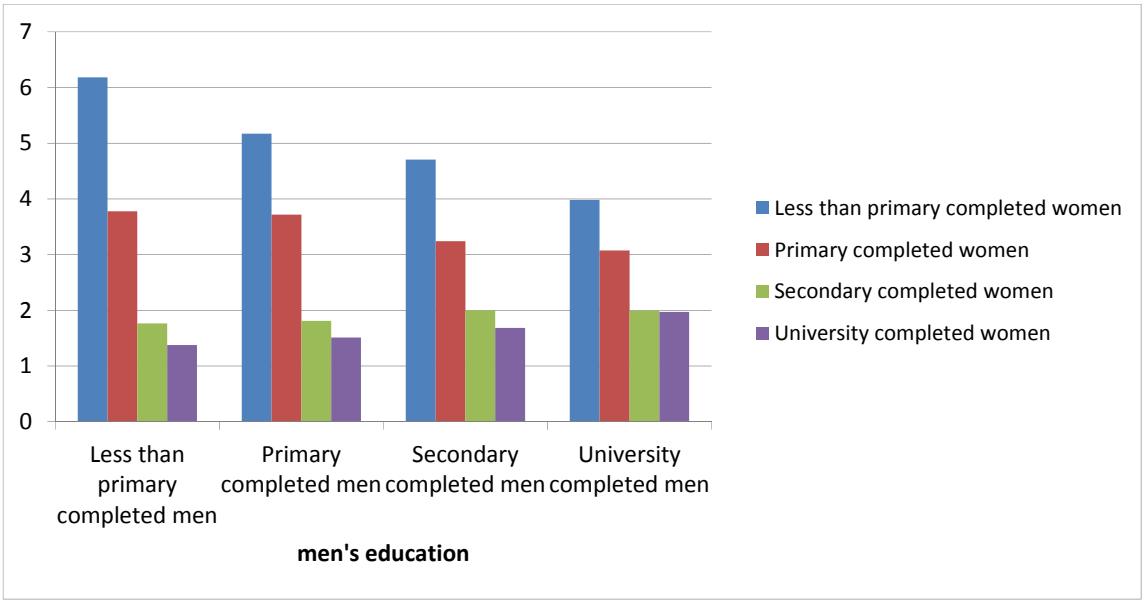


Source: Census (i-pums) 2000

SILC data is not used here as census data covers cohorts 1969 to 1974 which serve to calculate approximate completed fertility. Education proportions for these cohorts are approximately the same in the census and the SILC data.

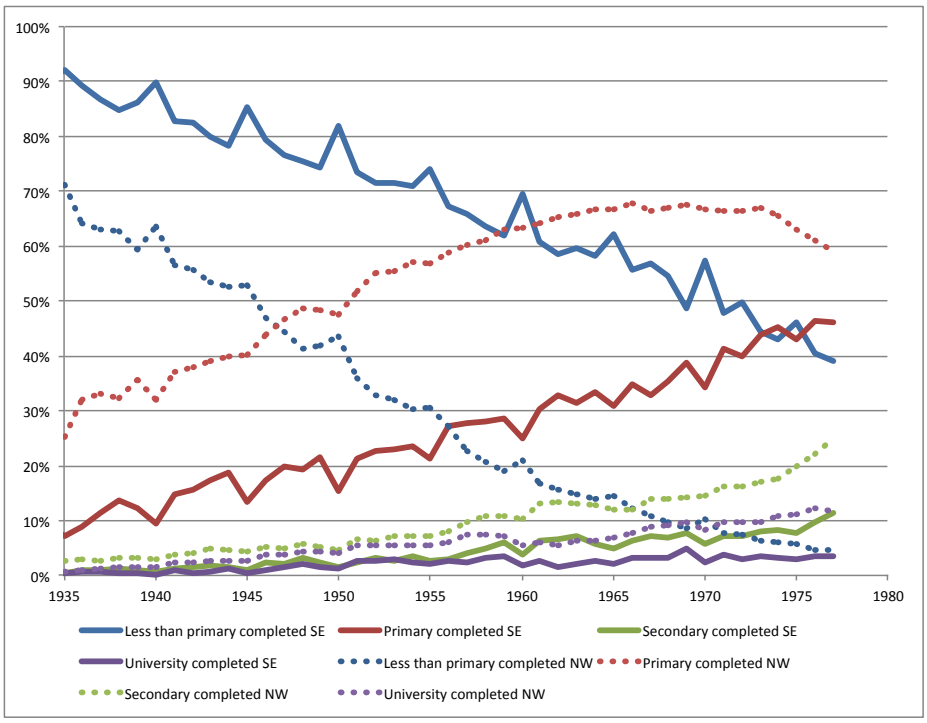
figure B. Completed fertility rates according to women's and their partner's level of education in Turkey





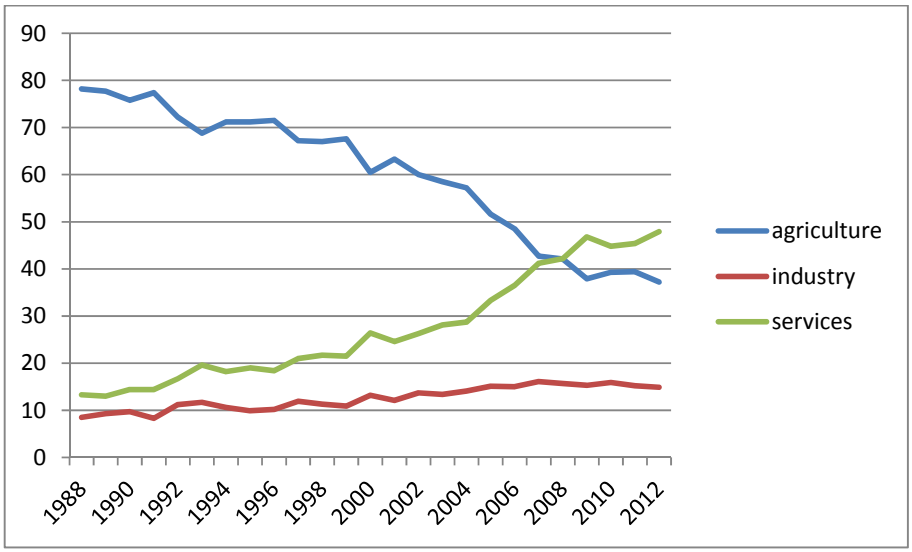
Source: Census (i-pums) 2000, women cohort 1950

Figure C. Proporition of women by regional background and education in Turkey (bold line South-Eastern women SE, dot line North-Western women NW)



Source: Census (i-pums) 2000

figure D. Proportion of women by activity sector in Turkey



Source: World Bank World Development Indicators (2014)

table A. Exogenous variables for 1st child arrival in Turkey

		no 1st child arrival	1st child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,193	0,160	
	Stable part-time employment	0,008	/	
	Stable full-time self employment	0,079	0,052	
	Stable part-time self employment	0,040	0,054	
	Stable unemployment	0,045	0,014	**
	Stable retirement	0,002	/	
	Stable student	0,192	0,008	***
	Stable inactivity	0,385	0,639	***
	Stable military service	0,000	/	
	Change in activity status within the observed three-months period)	0,057	0,073	
Partner information	*Partner in stable employment*	0,085	0,470	***
	Partner not in stable employment	0,017	0,098	***
	No partner	0,898	0,432	***
	Partner and married	0,101	0,568	***
	Partner but not married	0,001	/	
Both in stable employment		0,038	0,152	***
Household wage income	*Zero household wage income*	0,619	0,340	***
	Low household wage income	0,132	0,149	
	Medium household wage income	0,125	0,242	***
	High household wage income	0,123	0,269	***
Educational attainment	*Low education (illiterate, prim.not completed)*	0,330	0,416	***
	Medium education (primary and secondary)	0,567	0,478	***
	High education (tertiary)	0,103	0,106	
Age	*15-24*	0,664	0,660	
	25-34	0,231	0,323	***
	35-45	0,104	0,016	***
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2006-2011, childless w omen aged 15-45				

table B. Exogenous variables for 2nd child arrival in Turkey

		no 2nd child arrival	2nd child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,160	0,078	***
	Stable part-time employment	0,019	0,012	
	Stable full-time self employment	0,099	0,053	**
	Stable part-time self employment	0,043	0,072	*
	Stable unemployment	0,014	0,003	
	Stable retirement	0,009	/	
	Stable student	0,003	/	
	Stable inactivity	0,610	0,748	***
	Stable military service	0,000	/	
	Change in activity status within the observed three-months period)	0,045	0,034	
Partner information	*Partner in stable employment*	0,745	0,798	*
	Partner not in stable employment	0,146	0,146	
	No partner	0,110	0,056	**
	Partner and married	0,890	0,944	**
	Partner but not married	0,000	/	
Both in stable employment		0,244	0,181	*
Household wage income	*Zero household wage income*	0,126	0,087	*
	Low household wage income	0,309	0,371	*
	Medium household wage income	0,262	0,327	*
	High household wage income	0,303	0,215	**
Educational attainment	*Low education (illiterate, prim.not completed)*	0,537	0,601	*
	Medium education (primary and secondary)	0,360	0,324	
	High education (tertiary)	0,103	0,075	
Age	*15-24*	0,238	0,380	***
	25-34	0,420	0,573	***
	35-45	0,342	0,047	***
Age of first child	*0*	0,149	0,100	*
	1-2	0,237	0,393	***
	3-6	0,213	0,386	***
	7+	0,401	0,121	***
First child is female		0,437	0,483	
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2006-2011, w omen aged 15-45 w ith one child				

table C. Exogenous variables for third child arrival in Turkey

		no 3rd child arrival	3rd child arrival	Significance of difference
Stability on the labour market	*Stable full-time employment*	0,110	0,017	**
	Stable part-time employment	0,013	0,017	
	Stable full-time self employment	0,107	0,052	
	Stable part-time self employment	0,052	0,052	
	Stable unemployment	0,006	/	
	Stable retirement	0,005	/	
	Stable student	0,000	/	
	Stable inactivity	0,667	0,835	***
	Stable military service	0,000	/	
	Change in activity status within the observed three-months period)	0,040	0,026	
Partner information	*Partner in stable employment*	0,813	0,791	
	Partner not in stable employment	0,126	0,157	
	No partner	0,061	0,052	
	Partner and married	0,939	0,948	
	Partner but not married	0,000	/	
Both in stable employment		0,227	0,113	
Household wage income	*Zero household wage income*	0,079	0,070	
	Low household wage income	0,304	0,409	*
	Medium household wage income	0,314	0,296	
	High household wage income	0,303	0,226	
Educational attainment	*Low education (illiterate, prim.not completed)*	0,708	0,843	
	Medium education (primary and secondary)	0,239	0,139	
	High education (tertiary)	0,053	0,017	
Age	*15-24*	0,079	0,243	***
	25-34	0,422	0,617	***
	35-45	0,500	0,139	***
Age of second child	*0*	0,090	0,096	
	1-2	0,161	0,278	***
	3-6	0,234	0,409	***
	7+	0,514	0,217	***
Age difference first-second child		4,318	3,087	*
First two children have the same sex		0,458	0,557	*
* p<0,05, ** p<0,01, *** p<0,001				
Data Base: EU-SILC LT 2006-2011, women aged 15-45 with 2 children				

table D. Probability of stable employment in Turkey for childless women (logit regressions with robust standard errors)

	Model 1	Model 2	Model 3
Partner			
In stable employment		1.227***	
		(4.68)	
Not in stable employment		*Ref.*	
No partner		1.113***	
		(4.45)	
Woman's education			
no graduate (less than primary completed)			-0.428***
			(-4.83)
Primary and secondary			*Ref.*
University education			1.377***
			(13.77)
Woman's age			
16-24	*Ref.*	*Ref.*	*Ref.*
25-34	1.036***	1.027***	0.764***
	(15.35)	(14.82)	(10.69)
35-45	0.645***	0.676***	0.544***
	(6.70)	(6.84)	(5.57)
Intercept	-1.110***	-2.218***	-1.116***
	(-28.98)	(-8.86)	(-27.04)
Number of observations	5494		
Number of events	1739		
Pseudo R^2	0.0360	0.0398	0.0731

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

table E. Probability of stable employment in Turkey for women with one child (logit regressions with robust standard errors)

Table: Probability of stable employment in Turkey (logit regressions with robust standard errors)

married women aged 16-45 having one child, with observed partner

	Model 1	Model 2	Model 3
Partner			
In stable employment		0.867***	
		(5.81)	
Not in stable employment		*Ref.*	
Woman's education			
No graduate			0.245+
			(1.59)
Primary and secondary			*Ref.*
University education			1.751***
			(11.64)
Woman's age			
16-24	-0.402**	-0.394**	-0.0413
	(-2.98)	(-2.89)	(-0.28)
25-34			
35-45	0.474***	0.563***	0.397**
	(3.51)	(4.14)	(2.85)
Age of first child			
0	-0.278+	-0.261+	-0.294+
	(-1.58)	(-1.47)	(-1.59)
1-2			
3-6	0.223+	0.202+	0.366*
	(1.64)	(1.47)	(2.56)
7+	0.389*	0.428**	0.757***
	(2.48)	(2.72)	(4.49)
Intercept	-1.108***	-1.893***	-1.579***
	(-10.09)	(-10.76)	(-12.58)
Number of observations	2351		
Number of events	695		
Pseudo R^2	0.0411	0.0553	0.0887

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

table F. Probability of stable employment in Turkey for women with two children (logit regressions with robust standard errors)

Table: Probability of stable employment in Turkey (logit regressions with robust standard errors)

married women aged 18-45 having two children, with observed partner

	Model 1	Model 2	Model 3
Partner			
In stable employment		0.242*	
		(2.11)	
Not in stable employment		*Ref.*	
Women's education			
No graduate			0.0978
			(0.76)
Primary and secondary			*Ref.*
University education			2.088***
			(12.23)
Woman's age			
18-24	0.119	0.136	0.319
	(0.72)	(0.82)	(1.89)
25-34			
35-45	0.300**	0.310**	0.130
	(3.04)	(3.15)	(1.31)
Age of second child			
0	-0.132	-0.130	-0.229
	(-0.73)	(-0.72)	(-1.23)
1-2	*Ref.*	*Ref.*	*Ref.*
3-6	0.491***	0.485***	0.514***
	(3.76)	(3.71)	(3.77)
7+	0.478***	0.478***	0.738***
	(3.49)	(3.49)	(5.22)
Intercept	-1.520***	-1.737***	-1.729***
	(-13.74)	(-11.34)	(-14.54)
Number of observations	3633		
Number of events	983		
Pseudo R^2	0.0153	0.0164	0.0555

robust standard errors in parentheses; + p<0.15, * p<0.05, ** p<0.01, *** p<0.001

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